**Practical Polyphenolics: From Structure to Molecular Recognition and Physiological Action.** By Edwin Haslam (University of Sheffield). Cambridge University Press, New York, NY. 1998. xv + 422 pp. 17 × 24.5 cm. $100.00.

This book summarizes the work of Professor Haslam's distinguished career devoted to defining the significance of plant polyphenols. For that reason alone, it must be in the library of chemists and biologists interested in phenolic plant metabolites. The book is written in a friendly way, with excerpts taken from his personal correspondence that are especially interesting to those who have labored for years with these compounds. That historical perspective allows a nice focus on how far we have come in this science over the last 30 years. Most important, I believe, is that this book demonstrates the myriad ways that plant polyphenols influence our lives. Professor Haslam makes a strong argument for continued study of intermolecular association of plant polyphenols with other biopolymers.

At first glance, a reader with knowledge of the chemistry of plant polyphenols might be put back a bit by the claims that "this is the only book to describe the scientific basis for the action of plant polyphenols in a wide range of technologically important phenomena" because Professor Haslam himself has written other fine books and made important contributions to books edited by others. That claim, and the very selective treatment of the structure and biosynthesis of condensed and hydrolyzable tannins in Chapter 1, starts the book out on what I believe is a slow pace. For example, there is virtually no discussion of the chemistry of commercially important wattle or quebracho tannins and references to chestnut tannins are scarce. While largely a review of material that can be found in his previously published work, this chapter does provide a useful summary of the chemistry of these compounds for a reader new to the field.

Professor Haslam can be forgiven for the moderate pace at his start, however, because he warms to the real subject

of this book in Chapters 2 and 3 on molecular recognition and the interaction of plant polyphenols with other compounds. In these two chapters, he gains momentum and really begins to get into his usual stride. Here we find a nice series of thought-provoking essays. His insights are keen, and he challenges his readers to take up the task of learning more about how plant polyphenols interact with other biopolymers to express biological activity.

Professor Haslam's book continues to gain strength as he moves into Chapters 4 and 5, dealing with the role of plant polyphenols in the taste, bitterness, and astringency and the chemistry underlying the "maturation" of those properties in foods. Here he reaches full stride and engages us in discussions of the chemistry that might be considered the most important commercial and ecological aspects of these compounds. Readers are asked to study carefully as he carries us through a series of analyses of the significance of plant polyphenols in foods and beverages. His treatment of teas is especially nice. Here, associations between polyphenols and caffeine are highlighted. Similarly, the oxidation and complexation of condensed tannins with proteins define the properties of chocolate. The discussion of persimmon tannins and their use in Japan for a wide array of applications (including the removal of proteins from sake!) once more highlights the important associations between plant polyphenols and other biopolymers in their commercial use.

Chapter 5 also contains an interesting analysis of competitive binding of tannins to carbohydrates and proteins as an explanation for the loss of astringency in ripening of fruits. That leads the reader into a valuable summary of the chemistry of carbohydrate gels and mechanisms by which these gels can associate with and "encapsulate" polyphenols. A similar mechanism is proposed for the sequestration of tea polyphenols by casein to explain the loss of astringency resulting from milk in the tea. This chapter concludes with an analysis of the chemistry that occurs in aging of wines and the significance of oak polyphenols on the quality of whiskey.

In Chapter 6, Professor Haslam asks us to change our focus to our visual rather than taste senses. Inter- and intramolecular recognition once again comes to the fore in providing an explanation of how more than 250 million colors can be produced from such a few basic anthocyanin chromophores. This chapter especially makes one appreciate the great impact molecular associations have on the quality of our lives.

Favorite reading for many will lie in Chapters 7 and 8 because of the strong interest of the influence of plant polyphenols on human health. Professor Haslam has done well to stay with the fundamental science that supports the biological impacts of herbal medicines. Chapter 8 deals with perhaps the most important property of plant polyphenols, centering on their antioxidant properties and the chemistry of the oxidation of these extremely reactive compounds.

Chapter 9 appropriately closes the book with a valuable analysis of the physical chemistry that helps us understand the vegetable tanning process dating back at least 3000 years. Leather manufacture with vegetable tannins remains the predominant industrial use of these compounds, and they retain their market because of the high-quality heavy leather produced. Perhaps the earliest applications of intermolecular recognition and oxidation of *o*-quinones lie here. A reader can't avoid the thought that there is so much to do to bring our science to reasonable parallel with the art that we have applied to improve our lives.

Professor Haslam's book is attractively presented and reasonably priced at only $100/US. There are problems with some of the references, but readers with the intent of seriously studying these compounds will easily work through those minor errors. I, and I'm certain many others, will read this book many times over to appreciate the insights Professor Haslam shares with us.

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